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New records of cercosporoid fungi from Poland

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Abstract — Collections of four cercosporoid species are reported for the first time from Poland: *Cercospora echii* on *Echium vulgare*, *C. moravica* on *Caltha palustris*, *C. viburnicola* on *Viburnum opulus*, and *Passalora pastinacae* on *Pastinaca sativa*. Descriptions and illustrations of the fungi concerned are presented and remarks containing comparison with related species, distribution, and habitat are provided.

Key words — anamorphic fungi, hyphomycetes, leaf spot pathogens

Introduction

Cercospora Fresen. and *Passalora* Fr. are anamorphs of the ascomycetous genus *Mycosphaerella* Johanson (Shin & Kim 2001, Crous & Braun 2003, Crous 2009) belonging to the so-called cercosporoid fungi. Species of these genera are usually phytopathogenic, often causing leaf spots, occasionally hyperparasitic, and rarely saprobic (Hsieh & Goh 1990, Crous & Braun 2003, Agrios 2005, To-Anun et al. 2011).

Investigations of cercosporoid fungi from Poland have been carried out in the recent years, based on studies of field collections and revision of herbarium material. Thirty-eight *Cercospora* and thirty-one *Passalora* species have been registered in Poland (Świderska-Burek 2012). The results will be presented in a planned monograph of cercosporoid fungi of Poland.

Materials & methods

All collections examined are from Poland. The oldest material treated in this paper was collected in 1926 and is deposited in the herbarium of University of Warsaw. The other collections, deposited in the herbarium of the Department of Botany and Mycology in Lublin, are younger and have recently been re-examined.

The host plants infected with cercosporoid fungi were collected primarily from grasslands, taken to the laboratory, air-dried, and examined by light microscopy. The material was mounted in cotton blue and gently heated.

The monographs of Crous & Braun (2003), Chupp (1954), and Braun (1995) were used to identify the fungi. Nomenclature of the host plants follows The Plant List (http://www.theplantlist.org). Geographic regions of Poland follow the division used in Kondracki (2009). The specimens examined are deposited in the herbarium of the Department of Botany and Mycology in Lublin (LBL M) and Faculty of Biology in Warsaw (WA).

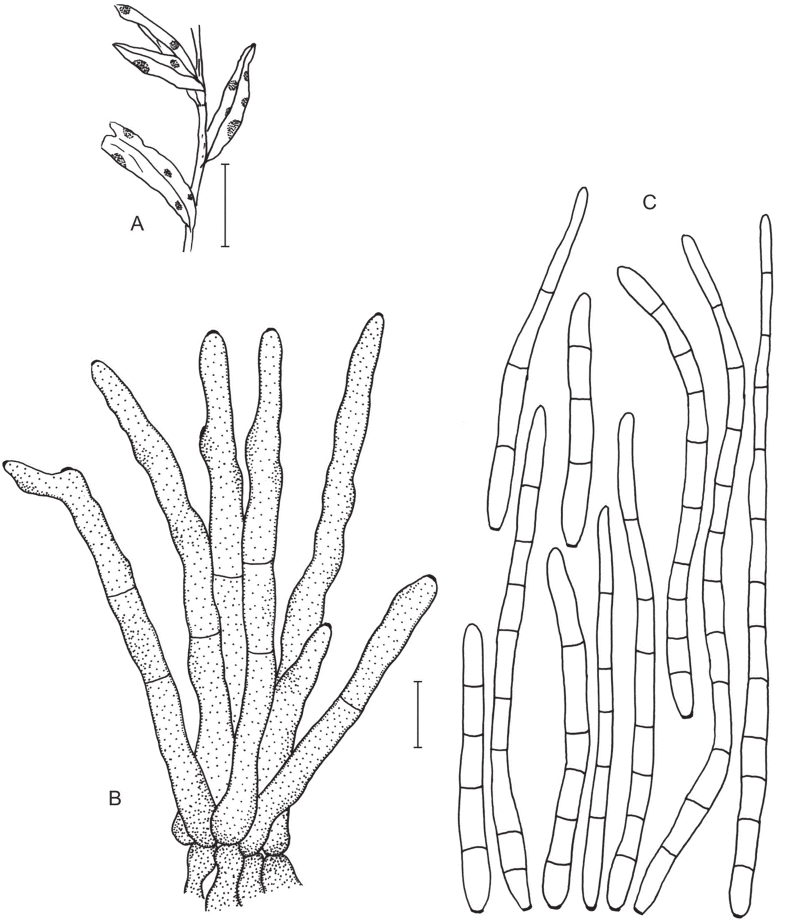

Fig. 1. *Cercospora echii* (LBL M–12168) on *Echium vulgare*.
A: Leaf spots. B: Conidiophores. C: Conidia.
Scale bars: A = 20 mm; B, C = 10 µm. U. Świderska-Burek del.

Taxonomy

Cercospora echii G. Winter, Hedwigia 23:190. 1884. Fig. 1

Leaf spots circular, 2–4 mm in diam., dark purplish or almost black center with pale margin. Fruiting amphigenous, mostly epiphyllous; stromata none or composed of several brown cells. Conidiophores 1–8 in fascicles, olivaceous-brown, multiseptate, rarely branched, up to 5 times geniculate, 40–142 × 4–5 µm. Conidia hyaline, acicular, straight or slightly curved, 3–12-septate, 40–125 × 2.5–3.5(–4) µm.

Specimen examined — **POLAND. Wołyńska and Małe Polesie Upland**, Czumów village near Hrubieszów town, xerothermic slope, on *Echium vulgare* L. (*Boraginaceae*), 19 September 1995, A. Zając (LBL M–12168).

Remarks: The fungus has been reported on four species of *Echium* — *E. italicum*, *E. platagineum*, *E. tuberculatum,* and *E. vulgare* — from Europe, Asia, Africa, North America, and Australia. *Echium vulgare* is distributed in Europe and southwestern Asia (Meusel et al. 1965–92, Zając & Zając 2009). In Europe, *C. echii* is known from five countries (Bulgaria, Portugal, Russia, Spain, and Ukraine; Crous & Braun 2003, Farr & Rossman 2014).

Cercospora echiorum is also known from *Echium* species, but it has shorter and slightly wider conidiophores (15–30 × 4–6 µm) and conidia (20–55 × 4–5 µm) (Chupp 1954). However, only *C. echii* has been found on *Echium vulgare* (Crous & Braun 2003).

Cercospora moravica (Petr.) U. Braun, Cryptog. Bot. 3: 235. 1993. Fig. 2

Leaf spots amphigenous, brown, angular, irregular or subcircular, 1–8 mm in diam., often confluent, margin indefinite, partially vein-limited. Fruiting amphigenous, whitish, sub-effuse. Conidiophores in loose or dense fascicles, hyaline, subcylindrical or geniculate-sinuous, straight, usually aseptate, 5.5–25 × 2–4 µm. Conidia hyaline, acicular, 1–8-septate, 30–135 × 1–2.5 µm.

Specimens examined — **POLAND. Nizina Środkowomazowiecka Lowland**, Garwolin town, water-meadow, on *Caltha palustris* L. (*Ranunculaceae*), 28 August 1986, H. Maszkiewicz (LBL M–12169); **Nizina Południowopodlaska Lowland**, Firlej village near Lublin town, water-meadow, on *Caltha palustris*, 12 May 1989, E. Kasińska (LBL M–12170).

Remarks: This fungus is confined to *Caltha palustris* and recorded only from Europe, although its host species is found also in North America and north Eurasia (Meusel et al. 1965–92, Zając & Zając 2009). *Cercospora moravica* has been collected in the Czech Republic, Finland, France, Germany, Great Britain, and Russia on this host (Crous & Braun 2003; Farr & Rossman 2014).

Cercospora palustris Losa was described on *Caltha palustris* from Spain in 1944, but this is an unresolved name (Crous & Braun 2003).

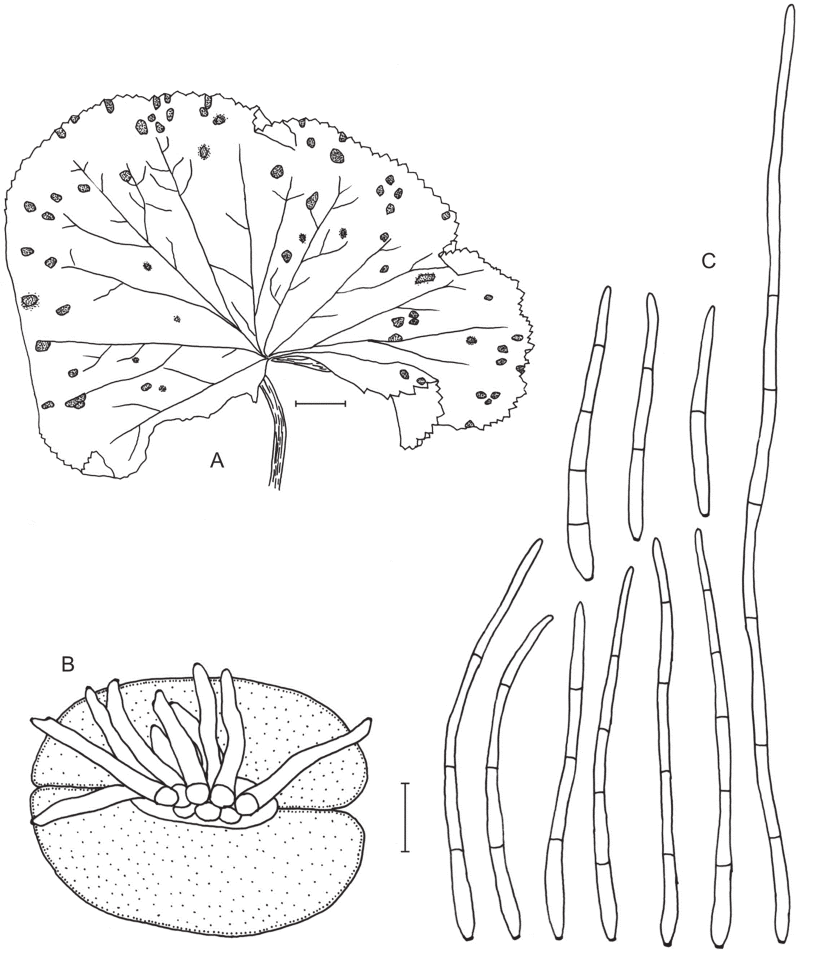

Fig. 2. *Cercospora moravica* (LBL M–12170) on *Caltha palustris*.
A: Leaf spots. B: Conidiophores. C: Conidia.
Scale bars: A = 20 mm; B, C = 10 μm. U. Świderska-Burek del.

Cercospora viburnicola W.W. Ray, Mycologia 33: 174. 1941. Fig. 3

Leaf spots angular or irregular, grayish brown with reddish brown margin. Fruiting amphigenous. Conidiophores mostly in dense fascicles, pale olivaceous-brown, straight, slightly curved or sinuous, sparingly septate,

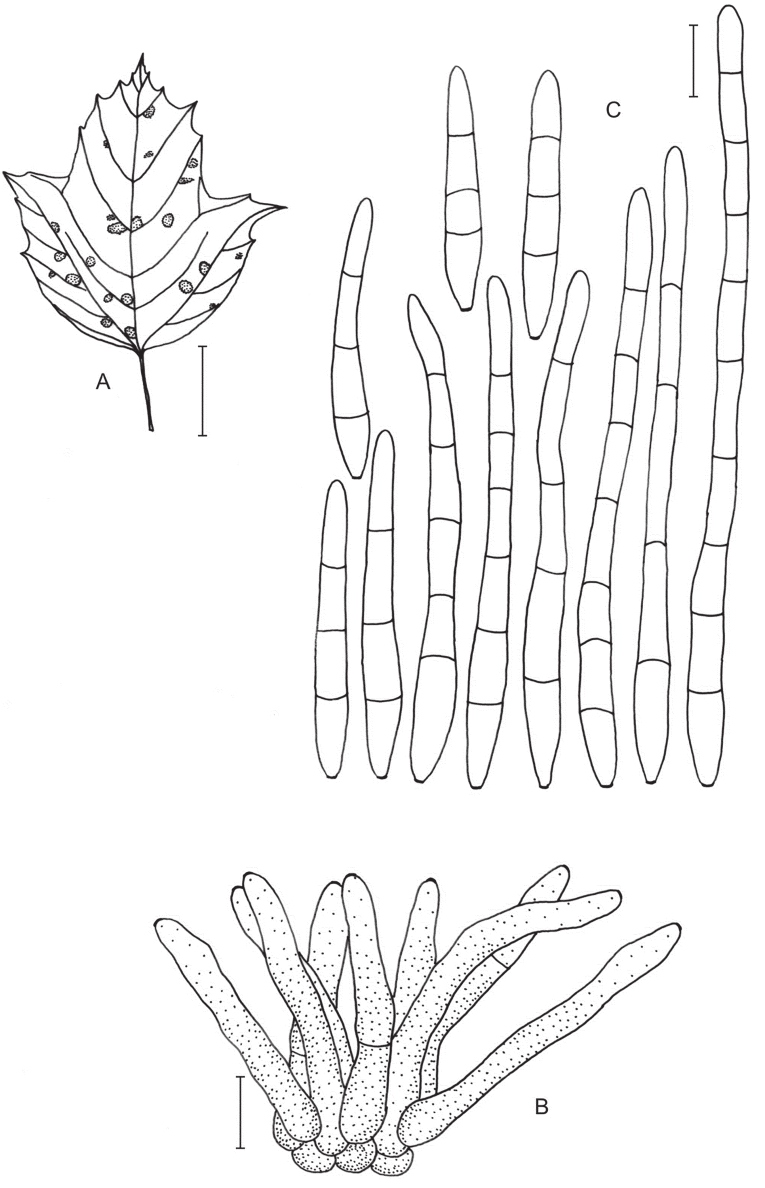

Fig. 3. *Cercospora viburnicola* (WA 029863) on *Viburnum opulus*.
A: Leaf spots. B: Conidiophores. C: Conidia.
Scale bars: A = 20 mm; B, C = 10 µm. U. Świderska-Burek del.

25–60 × 4–5.5(–6) µm. Conidia hyaline, acicular or obclavate, straight or slightly curved, 3–11-septate, 30–90(–205) × 3–5(–5.5) µm.

Specimen examined — **POLAND. Pojezierze Południowopomorskie Lakeland**, Jezioro Kadzionka Lake near Bydgoszcz town, on *Viburnum opulus* L. (*Adoxaceae*), 25 September 1926, N.N. (WA 029863, as *Cercospora* sp. on *Clematis vitalba*).

Remarks: This fungus has been recorded from only three countries — China, Korea, and USA — but from many localities and on many *Viburnum* spp. *Viburnum opulus* occurs in northwestern Eurasia (Meusel et al. 1965–92, Zając & Zając 2009). This is the first record of *C. viburnicola* in Europe (Crous & Braun 2003, Farr & Rossman 2014).

This species belongs to the complex of *Cercospora apii* s. lat. (Crous & Braun 2003). Environmental conditions, especially high temperature and humidity, influence the length of conidiophores and conidia. In the examined material, some conidia were longer (≤205 µm) and wider (usually 3–5.5 µm).

Six other cercosporoid hyphomycetes occur worldwide on *Viburnum*: *C. opuli* f. *brunneola* M.T. Lucas & Sousa da Câmara, *Passalora viburni* (Ellis & Everh.) U. Braun & Crous, *Pseudocercospora opuli* (Höhn.) U. Braun & Crous, *P. varia* (Peck) J.K. Bai & M.Y. Cheng, *P. viburni-cylindrici* (F.L. Tai) U. Braun, and *P. viburnigena* U. Braun & Crous. However, *C. viburnicola* is the only *Cercospora* species reported on *V. opulus* (Crous & Braun 2003).

Passalora pastinacae (Sacc.) U. Braun, Nova Hedwigia 55: 213. 1992. Fig. 4

Leaf spots angular, vein-limited, 1–3 mm in diam., mostly yellowish green or dark brown. Conidiophores solitary or 2–11 in fascicles, pale olivaceous, olivaceous-brown or yellowish brown, usually 1–2 geniculate, septate, not branched, 12–48 × 5–7 µm. Conidia subhyaline, cylindrical to obclavate, straight or slightly curved, 1–5-septate, 25–75 × 4–7 µm.

Specimen examined: **POLAND. Niecka Nidziańska Basin**, Rezerwat Skorocice reserve near Busko-Zdrój town, on *Pastinaca sativa* L. (*Apiaceae*), 14 September 1979, J. Romaszewska-Sałata (LBL M–12171).

Remarks: This fungus is known only from *Pastinaca sativa*; outside Europe it has been reported from Africa, North America, and Australia. According to Meusel et al. (1965–92) and Zając & Zając (2009), the host plant commonly occurs in semi-natural and synanthropic (transformed) habitats in Europe, but *P. pastinacae* has been found only in four European countries — Austria, Italy, Russia, and Romania (Crous & Braun 2003, Farr & Rossman 2014).

Cercospora apii is the only other cercosporoid species known to occur on *Pastinaca*. *Passolora pastinacae* differs from *C. apii* in having shorter, cylindrical–obclavate, not quite colourless conidia (Chupp 1954, Crous & Braun 2003).

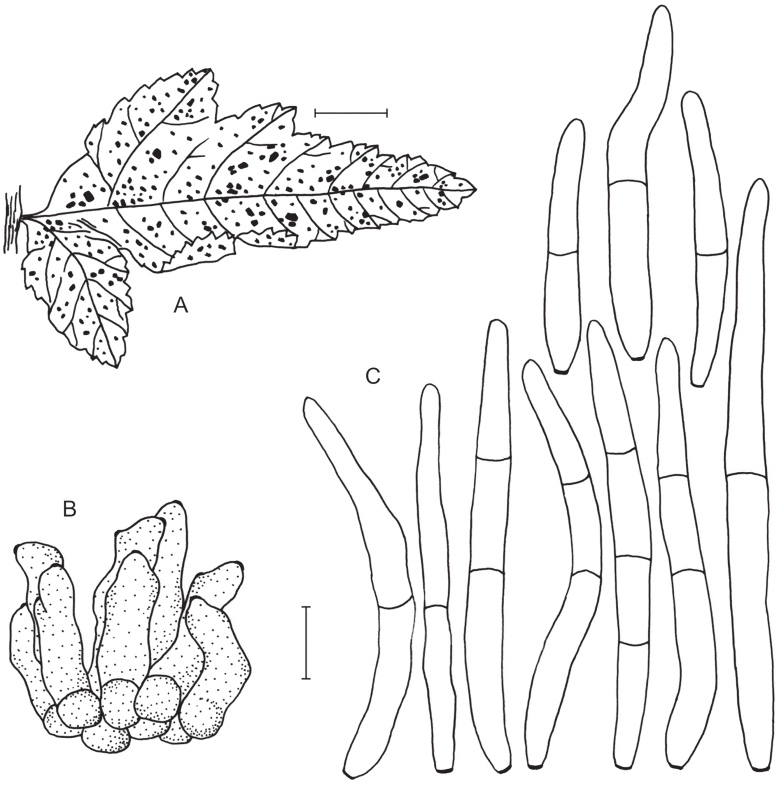

Fig. 4. *Passalora pastinacae* (LBL M–12171) on *Pastinaca sativa*.
A: Leaf spots. B: Conidiophores. C: Conidia.
Scale bars: A = 20 mm; B, C = 10 µm. U. Świderska-Burek del.

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